

REMARKS

Claims 1-27 were pending in this application.

Claims 1-27 have been rejected.

Claims 1, 10-12, 18, 26, and 27 have been amended as shown above.

Claims 1-27 remain pending in this application.

Reconsideration and full allowance of Claims 1-27 are respectfully requested.

I. REJECTION UNDER 35 U.S.C. § 101

The Office Action rejects Claims 1-27 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In particular, the Office Action asserts that the claims do not “enable their usefulness to be realized” because “there is only calculation, generation, and decomposition of matrices and projections” without any “display or tangible output [of] the matrices or projections.” (*Office Action, Page 2, Section 2*).

The Applicant has amended Claims 1, 11, 18, 26, and 27 as shown above. Claims 1, 11, 18, and 26 as amended recite using (i) a projected matrix, (ii) an orthogonal matrix and an upper triangular matrix, or (iii) a projection of a matrix to at least partially isolate a “first portion” of a second signal from a “second portion” of the second signal (where the “first portion” is associated with a first signal and the “second portion” is associated with at least one disturbance). Claim 27 as amended recites using an orthogonal matrix and an upper triangular matrix to at least partially isolate “one or more effects of one or more disturbances in a signal.”

The claims as amended do not merely recite the “calculation, generation, and

decomposition of matrices and projections.” Rather, these claims recite subject matter that produces a useful, concrete, and tangible result. Moreover, the Applicant respectfully notes that a claimed process for digitally filtering noise that employs a mathematical algorithm is statutory. (*MPEP* § 2106). Because of this, the Applicant respectfully submits that Claims 1-27 recite statutory subject matter.

Accordingly, the Applicant respectfully requests withdrawal of the § 101 rejection.

II. REJECTION UNDER 35 U.S.C. § 112

The Office Action rejects Claims 1, 10, 12, 18, and 26 under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter regarded as the invention. In particular, the Office Action objects to the use of the phrase “at least substantially” in Claims 1, 12, 18, and 26 and the phrase “at least one of” in Claim 10.

The Applicant has replaced the phrase “at least substantially” with the phrase “at least partially” in Claims 1, 12, 18, and 26. This removes the language forming the basis of the § 112 rejection from Claims 1, 12, 18, and 26. Regarding Claim 10, the Applicant respectfully submits that use of the phrase “at least one” is clear, meaning “one or more” of the identified elements.

Accordingly, the Applicant respectfully requests withdrawal of the § 112 rejection.

III. REJECTIONS UNDER 35 U.S.C. § 102

The Office Action rejects Claims 1, 4, 18, 21, and 26 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2003/0061035 to Kadambe et al. (“*Kadambe*”). The

Office Action rejects Claim 27 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2005/0015205 to Repucci et al. ("*Repucci*"). These rejections are respectfully traversed.

A prior art reference anticipates a claimed invention under 35 U.S.C. § 102 only if every element of the claimed invention is identically shown in that single reference, arranged as they are in the claims. (*MPEP* § 2131; *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990)). Anticipation is only shown where each and every limitation of the claimed invention is found in a single prior art reference. (*MPEP* § 2131; *In re Donohue*, 766 F.2d 531, 534, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985)).

Kadambe recites a system for blind source separation of an over-complete set of signals. (*Abstract*). The system stores a matrix X representing input from sensors and a matrix V representing noise, and the system iteratively determines an optimized matrix \hat{S} and an optimized matrix \hat{A} . (*Par. [0021]*). The matrix \hat{A} represents a mixing matrix and can be generated by transforming the matrix X into the "sparse domain." (*Par. [0022]*). The matrix \hat{S} represents a source signal estimate matrix. (*Par. [0021]*). Determining the optimized matrices \hat{S} and \hat{A} could involve clustering signal samples using a geometric constraint and then adjusting the clustering until convergence criteria are met. (*Par. [0023]*). Determining the optimized matrices \hat{S} and \hat{A} could also involve obtaining a multi-band sparse domain estimate of matrix \hat{S} and performing various actions in the Fourier and wavelet domains. (*Par. [0024]*). The matrix \hat{S} can then be used to recover the mixed signals. (*Par. [0083]*).

Kadambe simply recites a system where various matrices are generated and then iteratively altered to find optimal solutions for two of the matrices. *Kadambe* lacks any mention of projecting a matrix into an orthogonal space and then using the projection to at least partially isolate one portion of a second signal (which is associated with a first signal) from another portion of the second signal (which is associated with at least one disturbance). In fact, *Kadambe* only uses the term “projection” once (when discussing a “projection gradient method” in paragraph [0126]) and only uses the term “orthogonal” twice (when discussing wavelet functions in paragraph [0175]). *Kadambe* fails to provide any teaching that describes projecting a matrix into an “orthogonal space” or decomposing a matrix into a projection in an “orthogonal space,” where the projected matrix or projection at least partially isolates different portions of a signal.

For these reasons, *Kadambe* fails to anticipate the Applicant’s invention as recited in Claims 1, 18, and 26 (and their dependent claims).

Repucci recites a canonical decomposition method that involves building a multi-variate linear autoregressive (MLAR) model and then identifying a coordinate transformation of the model. (*Abstract*). Data can be captured and used to form a matrix, which then undergoes Principal Component Analysis (PCA) or some other analysis to reduce the number of components in the model. (*Par. [0055]*). This step reduces noise contained in the data. (*Par. [0061]*). An MLAR model is then generated using the reduced-component data. (*Par. [0062]*). A coordinate transformation of the model is then selected that transforms a matrix as closely as possible to a selected canonical form (such as an upper triangular matrix). (*Par. [0070]*).

Repucci simply recites a technique where a model can be built and transformed into canonical form, where the canonical form could be a triangular matrix. *Repucci* lacks any mention of performing a canonical QR-decomposition on a matrix to create an orthogonal matrix and an upper triangular matrix, where the upper triangular matrix has a “plurality of values” along its diagonal and each value is “greater than or equal to zero.” *Repucci* also lacks any mention of using the orthogonal matrix and the upper triangular matrix to “at least partially isolate one or more effects of one or more disturbances in a signal” as recited in Claim 27.

For these reasons, *Repucci* fails to anticipate the Applicant’s invention as recited in Claim 27.

Accordingly, the Applicant respectfully requests withdrawal of the § 102 rejections and full allowance of Claims 1, 4, 18, 21, 26, and 27.

IV. REJECTIONS UNDER 35 U.S.C. § 103

The Office Action rejects Claims 2, 3, 11-13, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* in view of *Repucci*. The Office Action rejects Claims 5-7, 22, and 23 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* in view of Ku et al., “Preconditioned Iterative Methods for Solving Toeplitz-Plus-Hankel Systems” (“*Ku*”). The Office Action rejects Claims 8-10, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* in view of U.S. Patent Publication No. 2003/0004658 to Bechhoefer et al. (“*Bechhoefer*”). The Office Action rejects Claims 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* and *Repucci* in further view of *Ku*. The Office Action rejects

Claims 16 and 17 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* and *Repucci* in further view of *Bechhoefer*. These rejections are respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP* § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second,

there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (*MPEP* § 2142).

Claims 2, 3, 5-10, 19, 20, and 22-25 depend from Claims 1 and 18. As shown above in Section III, Claims 1 and 18 are patentable. As a result, Claims 2, 3, 5-10, 19, 20, and 22-25 are patentable due to their dependence from allowable base claims.

Regarding Claims 11-17, both *Kadambe* and *Repucci* fail to disclose, teach, or suggest performing canonical QR-decomposition on a matrix to create an orthogonal matrix and an upper triangular matrix, where the upper triangular matrix has a "plurality of values along a diagonal of the matrix" and each value is "greater than or equal to zero" as recited in Claim 11. Both *Kadambe* and *Repucci* also fail to disclose, teach, or suggest using the orthogonal matrix and the upper triangular matrix to at least partially isolate a "first portion" of a "second signal" (which is associated with a first signal) from a "second portion" of the "second signal" (which is associated with at least one disturbance) as recited in Claim 11.

For these reasons, the proposed *Kadambe-Repucci* combination fails to disclose, teach, or suggest the Applicant's invention as recited in Claim 11 (and its dependent claims).

Accordingly, the Applicant respectfully requests withdrawal of the § 103 rejections and full allowance of Claims 2, 3, 5-17, 19, 20, and 22-25

V. **CONCLUSION**

The Applicant respectfully asserts that all pending claims in this application are in condition for allowance and respectfully requests full allowance of the claims.

SUMMARY

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@munckbutrus.com*.

The Commissioner is hereby authorized to charge any fees connected with this communication (including any extension of time fees) or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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Date: OCT 17, 2006



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